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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/656,777	09/07/2000	Junji Kuyama	09793822-0409	1570

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EXAMINER
WILLS, MONIQUE M

ART UNIT	PAPER NUMBER
1745	6

DATE MAILED: 10/21/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

ms 6

Office Action Summary	Application No.	Applicant(s)	
	09/656,777	KUYAMA ET AL	
	Examiner	Art Unit	
	Wills M Monique	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 July 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *10-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *10-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Amendment

This Office Action is responsive to the amendment filed July 8, 2002. The objection of claims 1-9 is overcome. The 35 U.S.C. 112, second paragraph rejections of claims 2-3 are overcome. The rejection of claims 1,2,4,-6 & 8-9 under 35 U.S.C. 102(b) as being anticipated by Miyasaka U.S. Patent 5,869,208 is overcome. The rejection of claim 7 under 35 U.S.C. 103(a) as being unpatentable over Miyasaka U.S. Patent 5,869,208 as applied to claim 4 above, and further in view of Nakajima et al. U.S. Patent 6,337,158 is overcome. The rejection of claim 3 under 35 U.S.C. 102(a) as being anticipated by Sugeno et al. U.S. Patent 6,083,646 is overcome. Claims 1-9 have been cancelled per applicants request. Claims 10-12 & 17-22 are rejected under 35 U.S.C. 103 (a) as being obvious Miyasaka U.S. Patent 5,869,208 in view of Tanno U.S. Patent 5,853,918. Claims 10-12 & 17-22 are also rejected under 35 U.S.C. 103(a) as being unpatentable over Miyasaka U.S. Patent 5,869,208 and further in view Sugeno et al. U.S. Patent 6,083,646. Claims 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugeno et al. U.S. Patent 6,083,646 and further in view of Kubo et al. U.S. Patent 5,773,168.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims10-12 & 17-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyasaka U.S. Patent 5,869,208 and further in view of Tanno U.S. Patent 5,853,918.

Miyasaka teaches In a lithium ion secondary battery having a positive electrode, negative electrode, a non-aqueous electrolyte, and a container, the positive electrode is made of a positive electrode active material having a spinel structure and the formula:

$$Li_x Mn_{2-a} M_{a/c} O._{4+b}$$

wherein M is cation of a metal other than Li and Mn; x, a and b are $0.1<x\leq 1.2$, $0\leq a<2.0$ (preferably $0<a<2.0$), $1\leq c\leq 3$, and $0\leq b<0.3$, during its charge-discharge cycle (see abstract). The positive electrode active material (or its precursor) and the negative electrode active material (or its precursor) preferably are in the form of particles having a mean diameter of 0.03 to 50 μ, more preferably 0.1 to 20μ. See column 8, lines 20-25. . The positive electrode active material or its precursor preferably has a specific surface area of 1 to 10 m^2 /g. See column 8, lines 25-31. The specific surface area is measured using the BET method (col. 11, lines 10-15). The electrolyte solution comprises a non-protonic organic solvent and a lithium salt (namely, electrolyte) soluble in the solvent. Examples of the organic solvents include propylene carbonate, ethylene carbonate, butylene carbonate, dimethyl carbonate, diethyl carbonate, gamma-butylolactone, 1,2-dimethoxyethane, tetrahydrofuran, 2-

methyltetrahydrofuran, dimethyl sulfoxide, 1,3-dioxolane, formamide, dimethyl formamide, dioxolane, acetonitrile, nitromethane, methyl formate, methyl acetate, phosphoric triester, trimethoxymethane, dioxolane derivatives, sulforane, 3-methyl-2-oxazolidinone, propylene carbonate derivatives, tetrahydrofuran derivatives, diethyl ether, and 1,3-propane sultone. These solvents can be employed singly or in combination. Examples of the lithium salts include $LiClO_4$, $LiBF_6$, $LiPF_6$, $LiCF_3 SO_3$, $LiCF_3 CO_2$, $LiASF_6$, $LiSbF_6$, $LiB_{10}Cl_{10}$, lithium salts of lower aliphatic carboxylic acids, $LiAlCl_4$ LiCl, LiBr, LiI, chloroborane lithium, and lithium tetraphenylborate. These lithium salts can be employed singly or in combination. See column 9, lines 1-30. The reference also teaches that polyfluorinated vinylidene can be employed in the positive electrode in the amount of 2 to 30% (col. 8, lines 30-45). Graphite ma by employed in the cathodic material in the range of 2 to 15% *col.8, lines 15-20).

The reference is silent to a carbonaceous anode selected from the group consisting of pyrocarbon, coke, glassy carbon, organic polymer compound sintered body and carbon fiber.

However, Tanno teaches that carbonaceous materials and graphite are equivalent to metallic lithium and lithium alloy materials for negative electrodes in secondary lithium cells (col. 1, lines 25-30). The reference also teaches that employing carbonaceous materials such as coke reduces capacity loss in the initial stage of charge and discharge cycles (col.1 , lines 50-55 and col.3, lines 20-25).

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to employ the carbonaceous materials of Tanno in place of the lithium anode of Miyasaka because, in order to reduce capacity loss in the initial stage of charge and discharge cycles of the cell.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 10-12 & 17-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyasaka U.S. Patent 5,869,208 , and further in view Sugeno et al. U.S. Patent 6,083,646.

Miyasaka teaches a lithium secondary battery described above, further comprising a lithium anodic material.

The reference is silent to a carbonaceous anode of the group provided said claim.

However, Sugeno teaches that coke and organic baked substances are equivalent to metallic lithium and lithium alloy materials for negative electrodes in secondary lithium cells (col. 2, lines 59-65).

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to employ the carbonaceous materials of Sugeno in place of the lithium anode of Miyasaka because, the secondary reference teaches that they are equivalent in similar electrochemical environments.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugeno et al. U.S. Patent 6,083,646 and further in view of Kubo et al. U.S. Patent 5,773,168.

Sugeno teaches a method of making a lithium manganese oxide (col. 5, lines 25-50). More particularly, in the first processing step, the mixture of the manganese source and the lithium source is crushed and mixed. Then, the mixture in a powder state, which may have been subjected to compression molding, is further subjected to a thermal treatment in an air atmosphere under a temperature of 450° C. or below. Subsequently, in the second processing step, the thermally-treated material, i.e., a sintered body is cooled down to a room temperature and again crushed and mixed. The mixture in a powder state, which may have been subjected to compression

molding, is further subjected to a thermal treatment in an air atmosphere under a temperature of 650 to 780° C. The cathode material comprising lithium-manganese oxide, graphite and polyvinylidene fluoride in a 90:7:3 ratio is coated on an aluminum current collector (col. 15, lines 30-35)

The reference is silent to a cathode thickness of 20 microns, pulverizing the active material or creating a slurry by dissolving the active material graphite and binder in a solvent. The reference does not expressly disclose employ the lithium composite manganese oxide in about 86%.

However, Kubo teaches that it is conventional to pulverize sintered lithium oxide material (col. 26, lines 20-25). The reference also teaches mixing lithium oxide, a conductor agent and binder and a suitable solvent to obtain a slurry in order to coat the active material on a current collector (col. 4, lines 55-60).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to dissolve the active material in a solvent to obtain a slurry to facilitate coating said active material on a current collector.

Regarding employing lithium oxide in about 86%, the reference teaches employing 90% of said active material in the cathode. However, it would have been obvious to one having ordinary skill in the art at the time of the invention to employ lithium oxide in about 86%, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). The skilled artisan recognizes that the amount of active material directly effects the conductivity of the electrode. Therefore, the skill

artisan would be motivated to employ the optimum amount of active material to directly control the conductivity of the electrode.

Regarding pulverization, the skilled artisan would have been motivated to pulverize the active material to make smaller particles. The skilled artisan recognizes that reducing particle size increases the area of reactivity, thus increasing utilization of the electrode.

As to creating a cathode having a thickness of 20 microns, it would have been an obvious matter of design choice to change the thickness to 20 microns, since such a modification would have involved a mere change in size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. In re Rose, 105 USPQ 237 (CCPA 1955).

Conclusions

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Monique Wills whose telephone number is (703) 305-0073. The Examiner can normally be reached on Monday-Friday from 8:30am to 5:00 pm.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0661.

If attempts to reach Examiner by telephone are unsuccessful, the Examiner's supervisor, Patrick Ryan, may be reached at 703-308-2383.

The unofficial fax number is (703) 305-3599. The Official fax number for non-final amendments is 703-872-9310. The Official fax number for after final amendments is 703-872-9311.

Mw

10/17/02

Patrick Ryan
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